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## **FEDERAL COMMUNICATIONS COMMISSION**

### **47 CFR Part 25**

**[IB Docket No. 21-456; FCC 23-29; FR ID 147722]**

### **Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed-Satellite Service Systems**

**AGENCY:** Federal Communications Commission.

**ACTION:** Proposed rule.

**SUMMARY:** In this document, the Federal Communications Commission (Commission or we) seeks comment on revisions to its rules governing spectrum sharing among a new generation of broadband satellite constellations to promote market entry, regulatory certainty, and spectrum efficiency. Specifically, the Commission seeks comment on which metrics should be used to define the protection afforded to a non-geostationary satellite orbit, fixed-satellite service (NGSO FSS) system authorized through an earlier processing round from an NGSO FSS system authorized through a later processing round, including the implementation of a degraded throughput methodology.

**DATES:** Comments are due **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Reply comments are due **[INSERT DATE 75 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

**ADDRESSES:** You may submit comments, identified by IB Docket No. 21-456, by any of the following methods:

- *FCC Website*: <http://apps.fcc.gov/ecfs>. Follow the instructions for submitting comments.
- *People with Disabilities*: Contact the FCC to request reasonable accommodations (accessible format documents, sign language interpreters, CART, etc.) by e-mail: [FCC504@fcc.gov](mailto:FCC504@fcc.gov) or phone: 202-418-0530 or TTY: 202-418-0432.

For detailed instructions for submitting comments and additional information on the rulemaking process, see the SUPPLEMENTARY INFORMATION section of this document.

**FOR FURTHER INFORMATION CONTACT:** Clay DeCell, 202-418-0803, [Clay.DeCell@fcc.gov](mailto:Clay.DeCell@fcc.gov).

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's Further Notice of Proposed Rulemaking (FNPRM), FCC 23-29, adopted April 20, 2023, and released April 21, 2023. The full text is available online at <https://docs.fcc.gov/public/attachments/FCC-23-29A1.pdf>. To request materials in accessible formats for people with disabilities, send an email to [FCC504@fcc.gov](mailto:FCC504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

## **Procedural Matters**

### **Comment Filing Requirements**

Interested parties may file comments and reply comments on or before the dates indicated in the DATES section above. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS).

- *Electronic Filers*. Comments may be filed electronically using the Internet by

accessing the ECFS: <http://apps.fcc.gov/ecfs>.

- *Paper Filers.* Parties who file by paper must include an original and one copy of each filing.
  - Filings may be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE Washington, DC 20554.
  - Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. *See* FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, DA 20-304 (March 19, 2020), <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.
- *People with Disabilities.* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), or to request reasonable accommodations for filing comments (accessible format

documents, sign language interpreters, CART, etc.), send an email to FCC504@fcc.gov or call 202-418-0530 (voice) or 202-418-0432 (TTY).

### ***Ex Parte* Presentations**

Pursuant to 47 CFR 1.1200(a), this proceeding will be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with 47 CFR 1.1206(b). In proceedings governed by 47 CFR 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and

must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

### **Regulatory Flexibility Analysis**

The Regulatory Flexibility Act of 1980, as amended (RFA), requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” We have prepared an Initial Regulatory Flexibility Analysis (IRFA) concerning the potential impact of the rule and policy changes contained in the FNPRM. The IRFA is set forth in Section IV below. Written public comments are requested on the IRFA. Comments must be filed by the deadlines for comments on the FNPRM indicated on the first page of this document and must have a separate and distinct heading designating them as responses to the IRFA.

### **Paperwork Reduction Act**

This document contains proposed modified information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and the Office of Management and Budget to comment on the information collection requirements contained in this document, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we seek specific comment on how we might further reduce the information collection burden for small business concerns with fewer than 25 employees.

### **Synopsis**

#### **I. Introduction**

1. In this document, we seek comment on revisions to the Commission’s rules governing spectrum sharing among a new generation of broadband satellite constellations to promote market entry, regulatory certainty, and spectrum efficiency through good-faith coordination. Specifically, we seek comment on which metrics should be used to define the protection afforded to an earlier-round NGSO FSS system from a later-round system, including the implementation of a degraded throughput methodology. This document will continue the Commission’s efforts to promote development and competition in broadband NGSO satellite services made possible by the new space age.

## **II. Background**

2. This proceeding continues the Commission’s recent efforts to update and refine its rules governing NGSO FSS systems. Constellations of NGSO FSS satellites traveling in low- and medium-Earth orbit may provide broadband services to industry, enterprise, and residential customers with lower latency and wider coverage than has previously been available via satellite. The number of applications filed in recent years for NGSO FSS system authorizations, and the number of satellites launched, are unprecedented.

3. *Processing Round Procedure Overview.* Applications for NGSO FSS system licenses and petitions for declaratory ruling seeking U.S. market access for non-U.S.-licensed NGSO FSS systems are considered in groups based on filing date, under a processing round procedure. Pursuant to the Commission’s rules, a license application for “NGSO-like” satellite operation, including operation of an NGSO FSS system, that satisfies the acceptability for filing requirements is reviewed to determine whether it is a “competing application” or a “lead application.” A competing application is one filed in response to a public notice initiating a processing round. Any other application is a lead

application. Competing applications are placed on public notice to provide interested parties an opportunity to file pleadings in response to the application. Lead applications are also placed on public notice. The public notice for a lead application initiates a processing round, establishes a cut-off date for competing NGSO-like satellite system applications, and provides interested parties an opportunity to file pleadings in response to the application.

4. The Commission reviews each application in the processing round and all the pleadings filed in response to each application. Based upon this review and consideration of such other matters as it may officially notice, the Commission will grant all the applications for which the Commission finds that the applicant is legally, technically, and otherwise qualified, that the proposed facilities and operations comply with all applicable rules, regulations, and policies, and that grant of the application will serve the public interest, convenience and necessity. The Commission will deny the other applications.

### **III. Discussion**

5. In the Report and Order in FCC 23-29, we adopt a requirement that, prior to commencing operations, an NGSO FSS licensee or market access recipient must either certify that it has completed a coordination agreement with any operational NGSO FSS system licensed or granted U.S. market access in an earlier processing round, or submit a showing for Commission approval that it will not cause harmful interference to any such system with which coordination has not been completed using a degraded throughput methodology. In this FNPRM, we propose to finalize the details of the degraded throughput methodology and invite specific comment on the appropriate values and assumptions to be used in this requirement and whether we should adopt a rule limiting

aggregate interference from later-round NGSO FSS systems into earlier-round systems.

6. We expect that the degraded throughput analysis should consist of three steps.

The first step is to establish a baseline of performance. To do this, an operator models the earlier-round NGSO system's performance without any additional interference by computing the earlier-round NGSO system's probabilistic C/N level using its published system parameters and a rain-attenuation model. This provides the baseline in terms of: (1) the earlier-round system's time-weighted average throughput (derived by computing the spectral efficiency from the C/N results), and (2) the earlier-round system's link unavailability time percentage (i.e., the percentage of time when the earlier-round system's expected C/N will fall below its minimum usable level). The second step is to repeat the analysis above, adding in the effect of the later-round system's interference into the earlier-round system. This produces a second measurement of time-weighted average throughput and link unavailability time-percentage. The third step is to compare these two sets of figures to measure the effect of any additional interference. If the resulting performance impact exceeds the permissible limits, then the later-round system must adjust its operations to mitigate interference to a permissible level. We seek comment on this process.

7. Specifically, noting that 3% has been suggested as an appropriate value for several aspects of the degraded throughput analysis, we invite comment on the appropriate values for these limits, including their technical justification. What is the appropriate baseline to consider for the earlier-round system, and should it include existing sources of interference, such as interference from GSO networks or intra-system interference? Should a degraded throughput methodology compare an incumbent's



baseline level of performance given only natural degradation to that same incumbent's expected performance given a single new entrant's operations? Should we use standardized antenna patterns and noise temperatures for the computation of  $C/(I+N)$  in a degraded throughput method? A degraded throughput methodology would rely on detailed technical data about the relevant NGSO FSS systems. How many locations should be evaluated in the methodology, and should the locations include sites outside the United States? How should rain fade conditions in different locations be incorporated into the degraded throughput analysis? What other technical data is needed to appropriately evaluate degraded throughput effects, and how can the Commission ensure that any degraded throughput analysis appropriately protects the specific characteristics of an NGSO system's operations? What role should Schedule S information play in the analysis? Are additional means needed to protect earlier-round systems against loss of synchronization due to potentially high levels of short term interference? Should the earlier-round operator be able to specify two C/N objectives – one relative to the C/N level below which the victim modem would lose lock and another relative to the C/N level below which the victim link would become unavailable because it is not able to offer the minimum wanted throughput? What mitigation techniques would be appropriate if degraded throughput thresholds were not otherwise satisfied?

8. We also note concerns on the record about aggregate interference from multiple NGSO systems. What is a permissible aggregate interference level for protecting priority NGSO systems in a frequency band, as part of an earlier processing round? Should we expect that there will be a maximum number of NGSO FSS systems that can be accommodated in a given frequency band and if so, how should that affect any inter-

round protection criteria and the opening of additional processing rounds? How does this methodology accommodate multiple NGSO systems that span multiple processing rounds?

9. Additionally, we seek comment on what criteria should be applied among NGSO systems after the sunset period. We recognize that our default spectrum splitting process is intended to encourage negotiation between systems in the same processing round. Should that also be the default procedure applicable between systems after the sunsetting of interference protection in order to facilitate coordination, or is there an alternative better suited to systems that may be at different stages of deployment? We seek comment on the fit of the default spectrum splitting process to the post-sunset environment. What does co-equal mean when there are established operators on a co-equal basis with newer entrants?

10. *Digital Equity and Inclusion.* Finally, the Commission, as part of its continuing effort to advance digital equity for all, including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, invites comment on any equity-related considerations and benefits (if any) that may be associated with the proposals and issues discussed herein. Specifically, we seek comment on how our proposals may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

#### **IV. Initial Regulatory Flexibility Analysis**

11. As required by the Regulatory Flexibility Act (RFA), the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant

economic impact on a substantial number of small entities by the policies and rules proposed in this Further Notice of Proposed Rulemaking (FNPRM). The Commission requests written public comments on this IRFA. Commenters must identify their comments as responses to the IRFA and must file the comments by the deadlines provided in the DATES section above and as instructed under Comment Filing Requirements above. The Commission will send a copy of the FNPRM, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration. In addition, the FNPRM and IRFA (or summaries thereof) will be published in the *Federal Register*.

**A. Need for, and Objectives of, the Proposed Rules:**

12. In recent years, the Commission has received an unprecedented number of applications for non-geostationary satellite orbit (NGSO) space station licenses, including for NGSO fixed-satellite service (FSS) systems. Traveling closer to the Earth than a traditional geostationary-satellite orbit (GSO) satellite, low- and medium-orbit NGSO FSS satellite constellations are capable of providing broadband services to industry, enterprise, and residential customers with lower latency and wider coverage than was previously available via satellite. This rulemaking continues to facilitate the deployment of NGSO FSS systems capable of providing broadband and other services on a global basis, and will promote competition among NGSO FSS system proponents, including the market entry of new competitors.

13. This FNPRM seeks public comment on proposed revisions to the Commission's rules governing the treatment NGSO FSS systems filed in different space station processing rounds. Specifically, this FNPRM seeks comment on details regarding the

implementation of a degraded throughput methodology. It also seeks comment on what criteria should be applied among NGSO systems after the sunset period.

**B. Legal Basis:**

14. The proposed action is authorized under sections 4(i), 7(a), 303, 308(b), and 316 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 303, 308(b), 316.

**C. Description and Estimate of the Number of Small Entities to Which the Proposed Rulemaking Will Apply:**

15. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules and policies, if adopted. The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.” In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act. A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

16. *Satellite Telecommunications.* This industry comprises firms “primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.” Satellite telecommunications service providers include satellite and earth station operators. The SBA small business size standard for this industry classifies a business with \$35 million or less in annual receipts as small. U.S. Census Bureau data for

2017 show that 275 firms in this industry operated for the entire year. Of this number, 242 firms had revenue of less than \$25 million. Additionally, based on Commission data in the 2021 Universal Service Monitoring Report, as of December 31, 2020, there were 71 providers that reported they were engaged in the provision of satellite telecommunications services. Of these providers, the Commission estimates that approximately 48 providers have 1,500 or fewer employees. Consequently using the SBA's small business size standard, a little more than half of these providers can be considered small entities.

17. *All Other Telecommunications.* The “All Other Telecommunications” category is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry. The SBA has developed a small business size standard for “All Other Telecommunications”, which consists of all such firms with annual receipts of \$35 million or less. For this category, U.S. Census Bureau data for 2012 show that there were 1,442 firms that operated for the entire year. Of those firms, a total of 1,400 had annual receipts less than \$25 million and 15 firms had annual receipts of \$25 million to \$49, 999,999. Thus, the Commission estimates that the majority of “All

Other Telecommunications” firms potentially affected by our action can be considered small.

**D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities:**

18. The Commission seeks comment on potential changes to the spectrum sharing requirements among NGSO FSS satellite systems. Specifically, comment is sought on how to implement the degraded throughput methodology. Because of the costs involved in developing and deploying an NGSO FSS satellite constellation, we anticipate that few NGSO FSS operators affected by this rulemaking would qualify under the definition of “small entity.”

**E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered:**

19. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rules for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”

20. The Commission adopted a requirement that, prior to commencing operations, an NGSO FSS licensee or market access recipient must either certify that it has completed a coordination agreement with any operational NGSO FSS system licensed or granted U.S.

market access in an earlier processing round, or submit a showing for Commission approval that it will not cause harmful interference to any such system with which coordination has not been completed using a degraded throughput methodology. This FNPRM invites comment on which specific metrics should be used to define the protection afforded to an earlier-round NGSO FSS system from a later-round system.

21. The Commission seeks comment on the appropriate values and assumptions to be used with the degraded throughput requirement. The Commission also seeks comment on whether to adopt a rule limiting aggregate interference from NGSO FSS systems that were authorized in a later processing round into NGSO FSS systems authorized in an earlier processing round. The Commission also seeks comment on alternative means of protection of earlier-round NGSO FSS systems.

22. The FNPRM also seeks comment on whether the Commission should expect that there will be a maximum number of NGSO FSS systems that can be accommodated in a given frequency band and if so, how should that affect any inter-round protection criteria and the opening of additional processing rounds. The FNPRM also seeks comment on how the degraded throughput methodology accommodates multiple NGSO systems that span multiple processing rounds.

23. To assist in the Commission's evaluation of the economic impact on small entities, as a result of actions that have been proposed in the FNPRM, and to better explore options and alternatives, the Commission seeks comment on whether any of the burdens associated with the filing, recordkeeping and reporting requirements described above can be minimized for small entities. Additionally, the Commission seeks comment on whether any of the costs associated with any of the proposed requirements to eliminate

unlawful robocalls can be alleviated for small entities. The Commission expects to more fully consider the economic impact and alternatives for small entities based on its review of the record and any comments filed in response to the FNPRM and this IRFA.

**F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules:**

24. None

**V. Ordering Clauses**

25. IT IS ORDERED, pursuant to Sections 4(i), 7(a), 10, 303, 308(b), and 316 of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 157(a), 160, 303, 308(b), 316, that this Further Notice of Proposed Rulemaking IS ADOPTED.

26. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center will send a copy of this Further Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with Section 603(a) of the Regulatory Flexibility Act, 5 U.S.C. 601 et seq.

Federal Communications Commission.

**Marlene Dortch,**

*Secretary.*

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